an optical absorption coefficient less than about 1.0 cm^{-1} at a wavelength of 450 nanometers.

15. A device comprising the gallium-containing nitride crystal of claim **8**.

16. A gallium-containing nitride crystal comprising:

a top surface having a crystallographic orientation within about 5 degrees of a {1 0-1 0} m-plane;

a substantially wurtzite structure;

n-type electronic properties;

an impurity concentration greater than about 3×10^{18} cm^{-3} of hydrogen;

an impurity concentration between about 5×10^{17} cm^{-3} and about 3×10^{19} cm^{-3} of oxygen;

an H/O ratio of at least 1.1;

an impurity concentration greater than about 1×10^{16} cm^{-3} of at least one of Li, Na, K, Rb, Cs, Ca, F, and Cl;

an optical absorption coefficient less than about 8 cm^{-1} at a wavelength of 400 nanometers;

an optical absorption coefficient less than about 6 cm^{-1} at a wavelength of 410 nanometers;

an optical absorption coefficient less than about 5.5 cm^{-1} at a wavelength of 415 nanometers;

an optical absorption coefficient less than about 4 cm^{-1} at a wavelength of 450 nanometers;

an absorbance per unit thickness of at least 0.01 cm^{-1} at 3188 cm^{-1}, 3175 cm^{-1}, 3164 cm^{-1}, and 3150 cm^{-1}; and

no infrared absorption peaks at wavenumbers between about 3125 cm^{-1} and about 3000 cm^{-1}, having an absorbance per unit thickness greater than 10% of the absorbance per unit thickness at 3188 cm^{-1}.

17. The gallium-containing nitride crystal of claim **16**, characterized by a carrier concentration n between about 10^{16} cm^{-3} and 10^{20} cm^{-3} and a carrier mobility η, in units of centimeters squared per volt-second, such that the logarithm to the base 10 of η is greater than $-0.018557[\log_{10}(n)]^3+1.0671[\log_{10}(n)]^2-20.599[\log_{10}(n)]+135.49$.

18. The gallium-containing nitride crystal of claim **16**, wherein the absorbance per unit thickness at 3232 cm^{-1} is at least 0.01 cm^{-1}.

19. The gallium-containing nitride crystal of claim **16**, further comprising an impurity concentration of at least one of silicon and germanium between about 1×10^{17} cm^{-3} and about 3×10^{18} cm^{-3}.

20. The gallium-containing nitride crystal of claim **16**, wherein the carrier concentration is between about 3×10^{17} cm^{-3} and about 3×10^{18} cm^{-3}.

21. The gallium-containing nitride crystal of claim **16**, wherein the top surface has a diameter greater than about 10 millimeters and the crystal has a thickness greater than about 100 micrometers.

22. A device comprising the gallium-containing nitride crystal of claim **16**.

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